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COMMENTS ON THE GENUS *POLITES*, WITH THE DESCRIPTION OF A NEW SPECIES OF THE *THEMISTOCLES* GROUP FROM MEXICO (HESPERIIDAE: HESPERIINAE)

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ABSTRACT. The *themistocles* group is distinguished from three other elements of the genus *Polites* Scudder on the basis of the stigma of the male and the genitalia of both sexes. The male and female genitalia of the *themistocles* group are comparatively illustrated (the female for the first time). A new, astigmal species, ***Polites norae***, is described and illustrated from Sonora, Mexico.

Additional key words: genitalia (male and female), *Polites baracoa*, *Yvretta*, *Hylephila*, *Wallengrenia*.

Polites Scudder is a principally North American genus of at least a dozen species, most of which occur within the United States. Skinner and Williams (1924) figured the male genitalia of our species of *Polites*, and these figures were reproduced by Lindsey, Bell and Williams in 1931 under the genus *Talides* Hübner. These remained the only comparative genitalic illustrations of the genus until Evans' (1955) caricatures appeared. Because the male genitalia of the closely related species within each of several assemblages are very similar, Evans' inaccurate and incomplete figures are not useful. The Skinner and Williams illustrations, while relatively accurate, suffer distortion and orientation differences owing to slide preparation, so that they mask similarities and suggest greater differences than exist.

Male genitalic similarities suggest that the nearest relatives of *Polites* are the genera *Yvretta* Hemming, *Hylephila* Billberg, and *Wallengrenia* Berg. *Polites* is not closely related to *Hesperia* Fabricius as repeatedly maintained by Scott (1992:1, 126, 167, 168). Based on the male and female genitalia and features of the male stigma, four distinct elements can be identified within *Polites*: *Polites baracoa* (Lucas), the

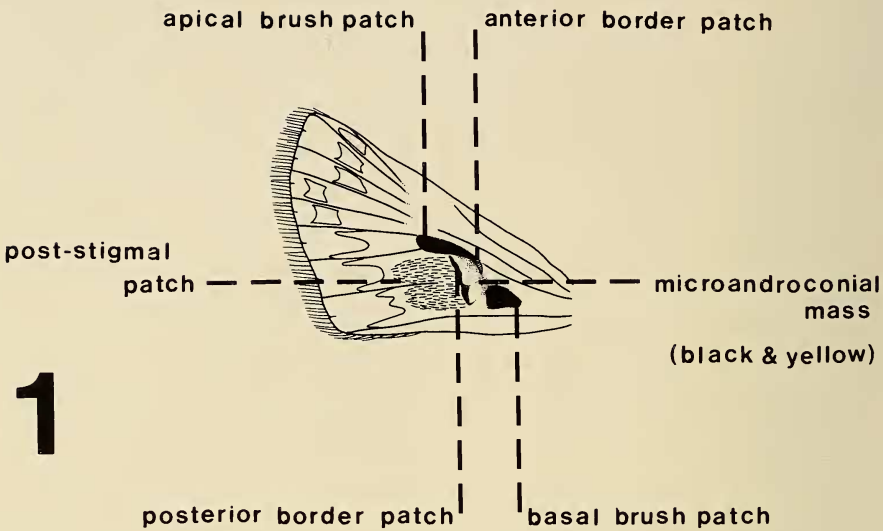
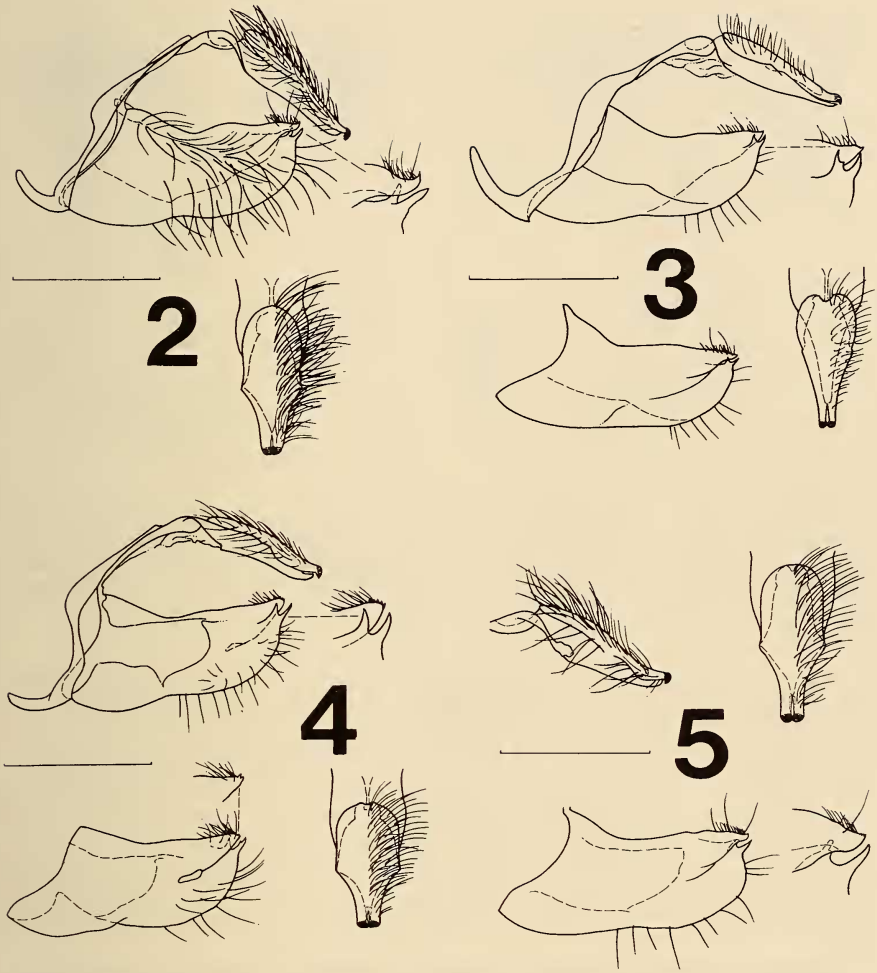


FIG. 1. Diagram of left forewing of *Polites draco* male illustrating stigma structures.

vibex group, the *origenes* group, and the *themistocles* group. *Polites baracoa* is peculiar. Although it retains the general stigmal and genitalic plan of *Polites*, it departs in most details from other groups. In particular, males seem to have lost, at the dorsocaudal tip of the uncus, the pair of shiny patches (pectines) that are minutely striated longitudinally. These terminal uncal pectines are characteristic of *Polites* and all related genera.

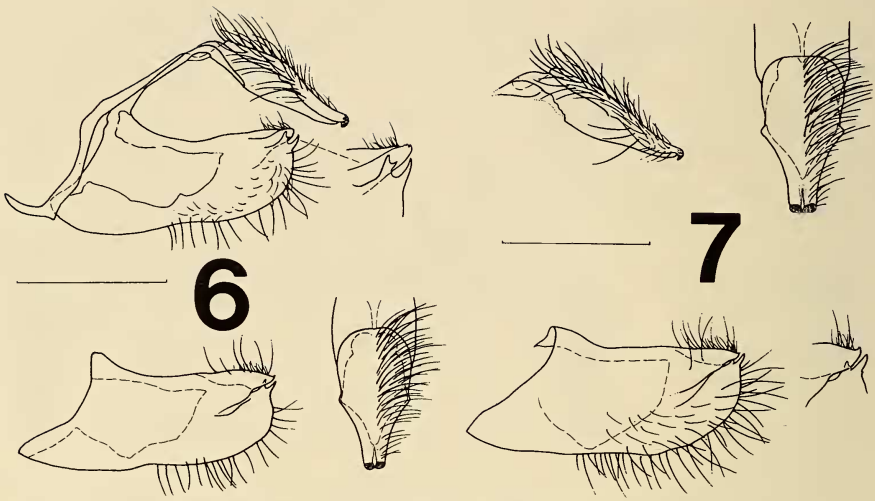
The five species *P. themistocles* (Latreille), *P. peckius* (Kirby), *P. mardon* (Edwards), *P. draco* (Edwards), and *P. sabuleti* (Boisduval) constitute the *themistocles* group. All have such remarkably similar male genitalia that individual variability sometimes equals the apparent specific differences. Thus Evans (1955) viewed the three "western" species as conspecific. Although *P. mardon*, *P. draco*, and *P. sabuleti* are apparently allopatric or allochronic, they approach one another very closely in many areas and show no evidence of introgression. Scott (1986:443) claimed intermediates between *sabuleti* and *draco* but later (1992:127) withdrew the statement. The morphology and biology of these three entities seem sufficiently distinct (Comstock 1929:25, Dethier 1943:128, Newcomer 1966:243, Emmel and Emmel 1973:82, MacNeill 1975:483, Stanford 1981:118, Scott 1992:125) to consider them species.

Polites mardon retains its integrity (but with apparent population differences) from Washington to California, with its stubby wings, vague (often fuzzy) markings, reduced stigmal elements, distinctive male and



FIGS. 2–5. Uncus, tegumen (left lateral and dorsal aspects and valvae (lateral aspects) of male genitalia of two species of *Polites*. Bar equals 1 mm. **2,** *Polites sabuleti sabuleti,* Sherman Isl., Sacramento Co., California, 4 October 1969, D. F. Shillingburg (genitalic dissection no. 6021-CDM); **3,** *Polites sabuleti sabuleti,* Asilomar, Monterey Co., California, 26 September 1959, C. W. O'Brien (genitalic dissection no. 3988-J. Herrera); **4,** *Polites sabuleti margaretae,* paratype, S.E. shore of La Paz harbor, B.C.S., MEXICO, 6 December 1961, Cary-Carnegie Expedition 1961 (genitalic dissection no. 6014-CDM); **5,** *Polites draco,* nr. Antero Jct., Park Co., Colorado, 1 June 1974, R. E. Stanford (genitalic dissection no. 6023-CDM).

female genitalia (Figs. 8, 17, 24), oviposition without adhesive (MacNeill unpubl. data), size and color of ova, and color pattern and chaetotaxy of larvae and pupae (Newcomer 1966, MacNeill unpubl. data). *Polites draco* also is possibly polytypic. Scott (1986:443) asserted that it is

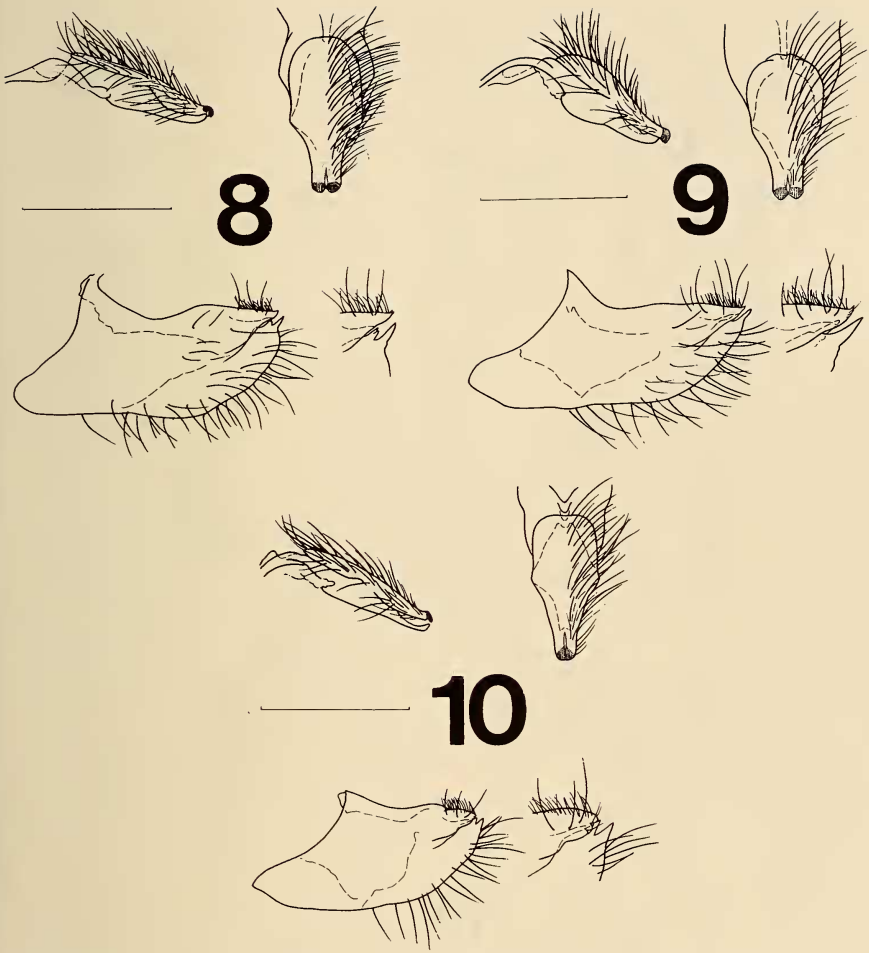


FIGS. 6, 7. Uncus, tegumen (left lateral and dorsal aspects and valvae (lateral aspects) of the male genitalia of *Polites norae*. Bar equals 1 mm, **6**, Paratype, Bacochibampo Bay, vic. Guaymas, Sonora, MEXICO, 22 April 1988, C. D. MacNeill & N. MacNeill-Manss (genitalic dissection no. 6013-CDM); **7**, Paratype, same data as above (except genitalic dissection no. 6012-CDM).

"probably an altitudinal ssp. of *sabuleti*" but later recanted (Scott 1992: 127) that contention. From the Yukon south to New Mexico, Arizona, and possibly southern Nevada *Polites draco* retains its distinctive markings (though these vary somewhat with altitude [Brown 1962] and latitude), color and form of the male stigma (but in Wyoming the stigma color varies), characteristic male and female genitalia (Figs. 1, 5, 14, 27), size and color of ova and first instar larvae (Scott 1992, MacNeill unpubl. data), and setal characteristics of the latter (MacNeill unpubl. data).

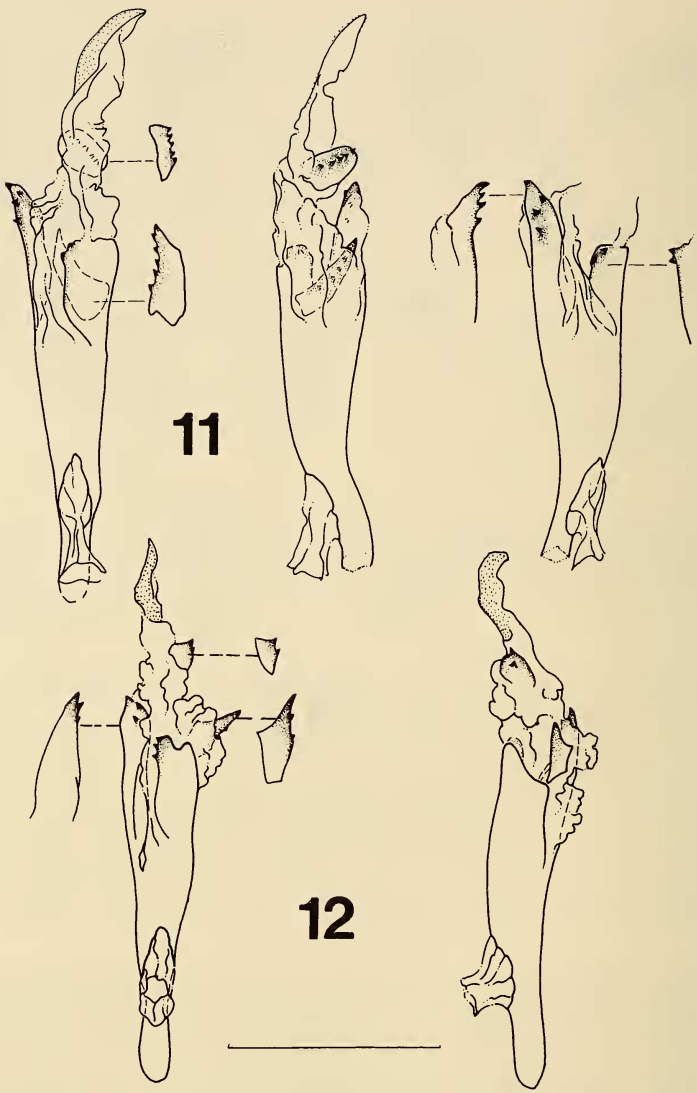
Polites sabuleti (Figs. 2–4, 11–13, 20, 21, 23, 25) is not well understood at present. It is polytypic through its wide distribution from British Columbia to the southern tip of Baja California Sur and eastward across Idaho into Colorado and New Mexico, with an ecological and altitudinal range from the coastal strand and salt marsh at sea level to alpine fell fields at over 4000 m in California. It was reviewed thoroughly for Nevada by Austin (1987, 1988). I am convinced that more than one species goes under this name—a possibility mentioned by Shapiro (1975: 37)—but a much better understanding of the many named and unnamed populations ascribed to *sabuleti* requires further study.

Polites peckius (Figs. 9, 18, 28) without adhesive (Scudder 1889: 1687, Scott 1992:124, 129, 130) and *P. themistocles* (Figs. 10, 19, 29) with adhesive during oviposition are principally eastern, though both



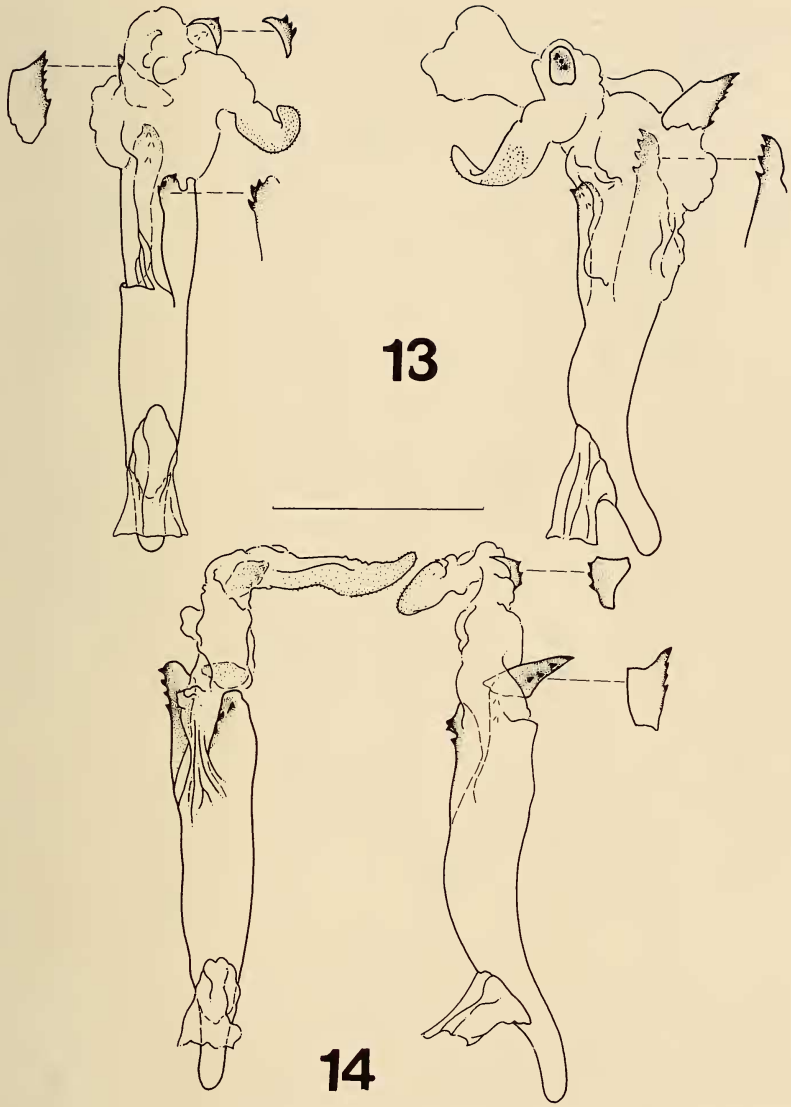
FIGS. 8–10. Uncus, tegumen (left lateral and dorsal aspects) and valvae (lateral aspects) of the male genitalia of three species of *Polites*. Bar equals 1 mm. **8,** *Polites mardon*, Signal Peak, Yakima Co., Washington, 22 June 1965, E. J. Newcomer (genitalic dissection no. 6009-CDM); **9,** *Polites peckius*, Trail, British Columbia, CANADA, 1952, A. C. Jenkins (genitalic dissection no. 6024-CDM); **10,** *Polites themistocles*, nr. Dead Horse Summit, 5 mi S. E. Bartle, 1280 m, Siskiyou Co., California, 3 July 1963, C. D. MacNeill (genitalic dissection no. 6027-CDM).

range through the Rocky Mountains and beyond into several Pacific Coast states or provinces. Although each also may be more than one entity, they maintain their morphological and biological distinctness (Scudder 1889, Dethier 1938, 1939, 1942, Shapiro 1974, Stanford 1981, MacNeill 1975, Scott 1992) everywhere they approach or interdigitate with other species of the group.



FIGS. 11, 12. Penis (vesica everted) of male genitalia of *Polites sabuleti sabuleti*. Bar equals 1 mm. **11,** Same data as Fig. 2, dorsal, left lateral and right dorso-lateral aspects (tip of coecum penis broken); **12,** Same data as Fig. 3, dorsal and left lateral aspects.

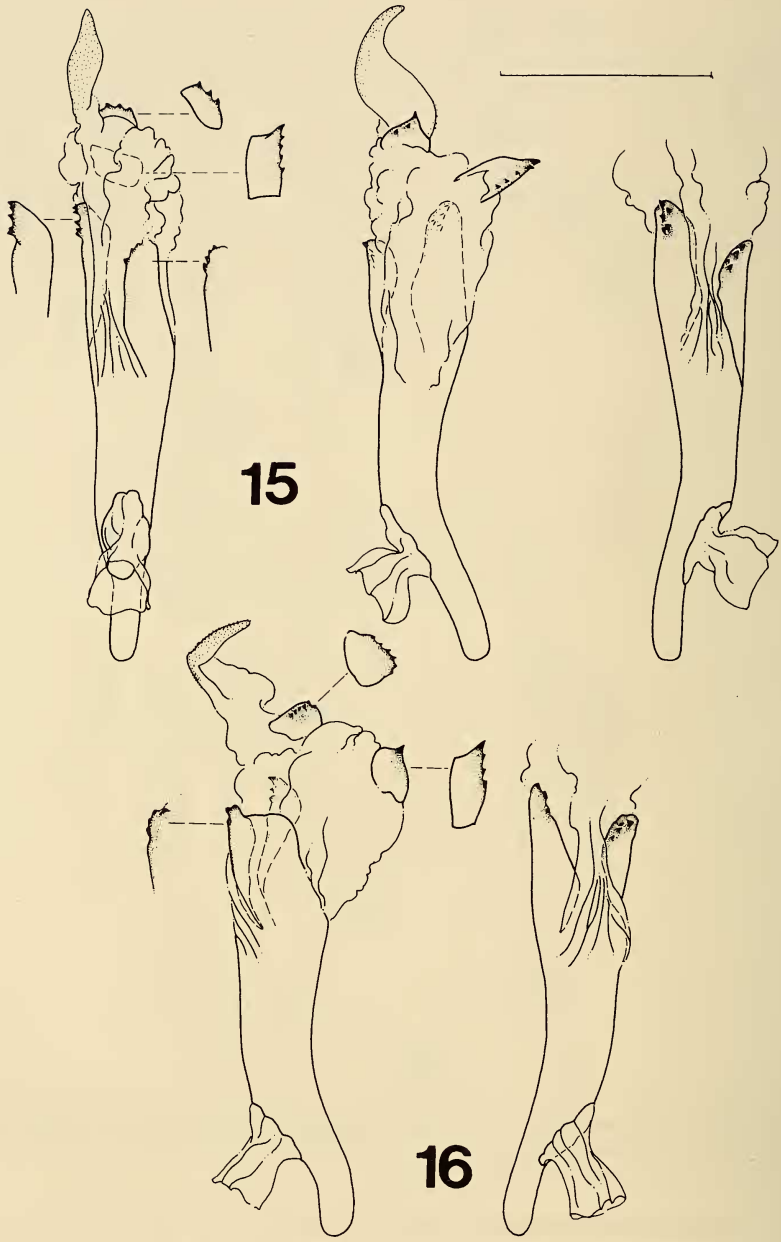
The purpose of this paper is twofold: to provide a brief diagnosis and comparative illustrations of male and female genitalia for the *themistocles* group of *Polites* and to shift our perspective on *sabuleti* (s.l.) by introducing a remarkable new species of the *themistocles* group from Mexico.



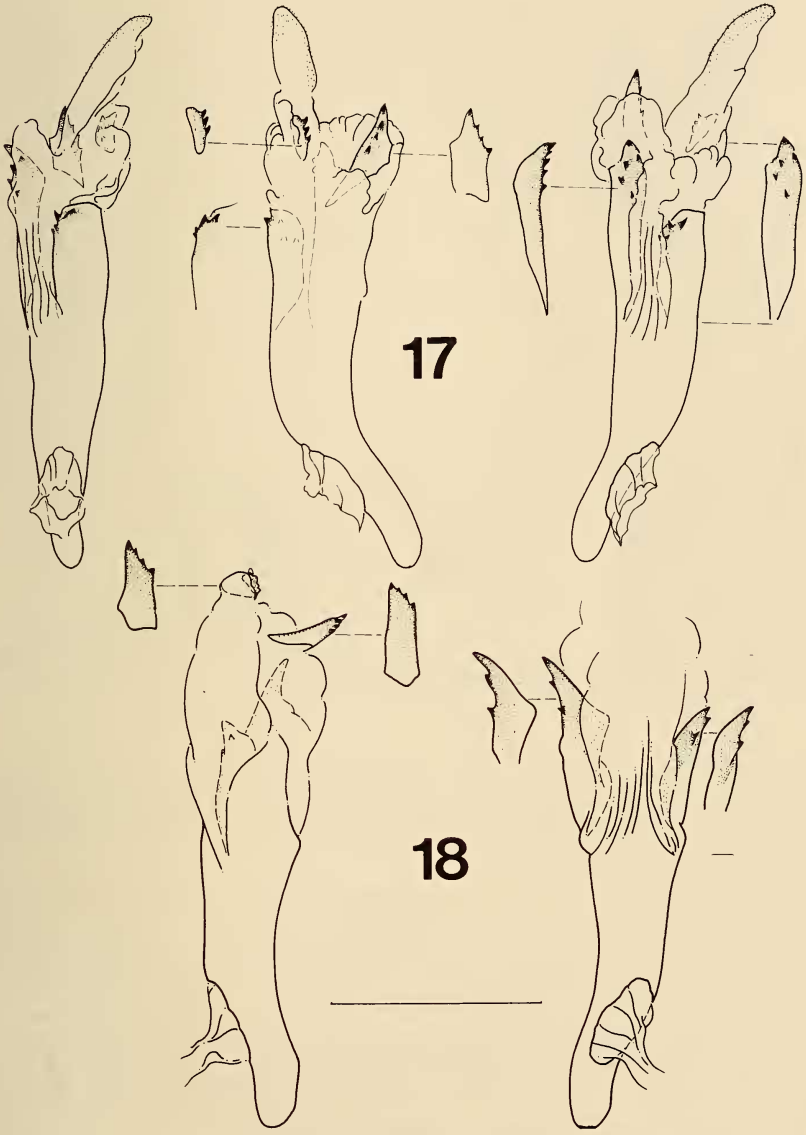
FIGS. 13, 14. Penis (vesica everted) of male genitalia of two species of *Polites*, dorsal and left lateral aspects. Bar equals 1 mm. **13,** *Polites sabuleti margaretae*, same data as Fig. 4; **14,** *Polites draco*, same data as Fig. 5.

DIAGNOSIS OF THE *THEMISTOCLES* GROUP OF *POLITES*

The following features of the male stigma and of the genitalia will distinguish the *themistocles* group of species from the remainder of the genus *Polites*. Terminology for the stigma is a modification of that in MacNeill (1964:49); terminology for the genitalia follows Klots (1970).



FIGS. 15, 16. Penis (vesica everted) of male genitalia of *Polites norae*. Bar equals 1 mm. **15,** Same data as Fig. 6, dorsal, left lateral and right dorso-lateral aspects; **16,** Same data as Fig. 7, left lateral and right dorso-lateral aspects.



FIGS. 17, 18. Penis of male genitalia of two *Polites* species. Bar equals 1 mm. **17,** *Polites mardon,* same data as Fig. 8, dorsal, left lateral and right dorso-lateral aspects (vesica everted); **18,** *Polites peckius,* same data as for Fig. 9, left lateral and right dorso-lateral aspects (vesica partially everted).

Stigma (if present) (Fig. 1): Apical brush patch conspicuous, broad and long, exceeding apical tip of microandroconial mass by half its length; scales very fine, hair-like, dense and erectile. Basal brush patch large, distinctly offset basad, usually almost separated from basal portion of microandroconial mass, scales hair-like, erectile. Anterior border

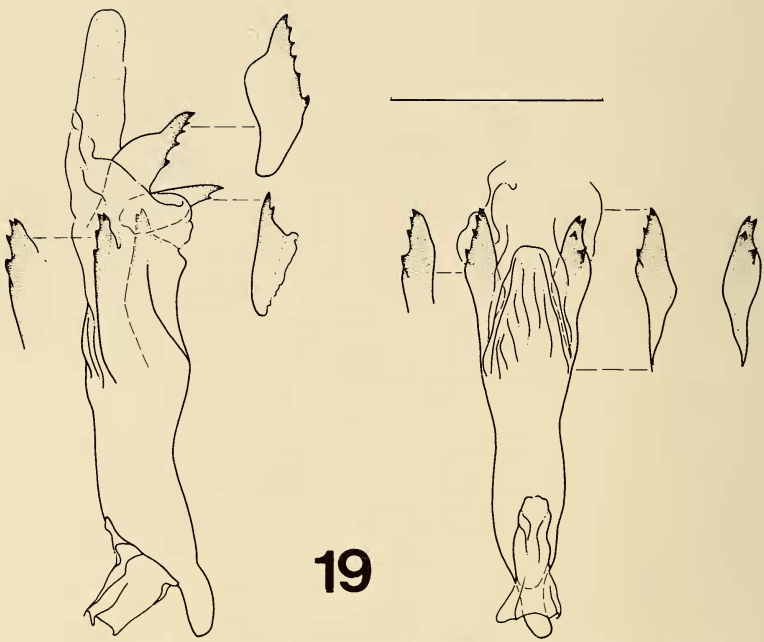


FIG. 19. Penis (vesica everted) of male genitalia of *Polites themistocles*, same data as Fig. 10, left lateral and dorsal aspects. Bar equals 1 mm.

patch conspicuous to obsolete. Posterior border patch conspicuous, broad to slender. Microandroconial mass broad and short, total length subequal to length of apical brush patch, scales very minute, linked sausage-like, often placed in two longitudinal zones of different colors and different scale structure and link lengths. Post-stigmal patch massive to inconspicuous.

Male genitalia (Figs. 2–19): Penis stout; aedeagus abruptly thickened at ductus ejaculatorious to about twice width of coecum penis (phallobase?) in lateral view, not caudally prolonged into a mid-ventral spur; coecum penis short, in lateral view not, or scarcely, longer than mid-aedeagus width; separated lateral, elongate rostella (titillators of Burns 1987) more or less dorsad, the left usually more dorsal than the right and usually much shorter, not united ventrally; vesica with three cornuti, one a minutely scobinate area along one side of an elongate, finger-like pouch, the other two usually dissimilar sclerotized, thorn-like or multidentate, coned or tented structures that are not themselves enveloped on one side. Uncus only slightly upturned at tip, terminal uncal pectines broad and conspicuous; gnathos not or scarcely exceeding caudal tip. Valva with distal tip of valvula usually dorsally bidentate or weakly tridentate, in caudal view only slightly bent inward (not conspicuously folded) under the flanged caudal tip of the cucullus (but *P. themistocles* tends to have the most strongly inward-bent portion weakly multidentate).

Female genitalia (Figs. 20–29): Ductus bursae more or less well sclerotized, dorsally with a conspicuous longitudinal fold in the ductus roof ending proximally just short of the ductus seminalis, ventrally with a proximal pouch, often less sclerotized. Lamella postvaginalis mostly membranous, only weakly sclerotized as a pair of well separated, vague, curved, longitudinal patches, not sclerotically joined with apophyses anteriores, distally without an isolated, median, sclerotized, finger-like nipple projecting ventrocaudad.

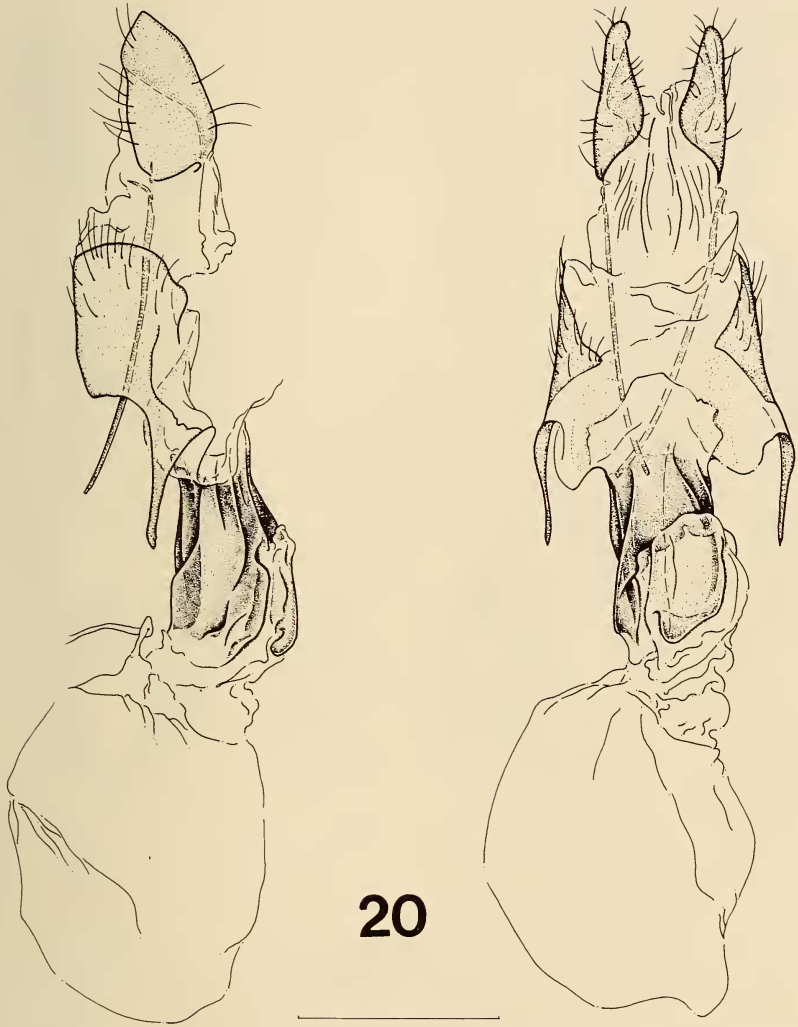


FIG. 20. Female genitalia of *Polites sabuleti sabuleti*, left lateral and ventral aspects, Morro Bay, San Luis Obispo Co., California, 21 October 1979. D. F. Shillingburg (genitalic dissection no. 6049-CDM). Bar equals 1 mm.

Aside from the general color pattern, which is fairly reliable, species within the *themistocles* group of *Polites* may be distinguished by means of the following characters: wing shape, and color and development of different parts of the male stigma. The differences in the male genitalia include the shape of the uncus in dorsal view, the width and development of the "chin" of the valvae, the shape and stockiness of the

FIG. 21. Female genitalia of *Polites sabuleti margaretae*, paratype, left lateral and ventral aspects, S.E. shore of La Paz harbor, B.C.S., MEXICO, 10 November 1961, Cary-Carnegie Expedition 1961 (genitalia dissection no. 6036-CDM).

penis, the length and teeth of the rostella, and particularly, the shape and dentition of the cornuti. Female genitalia are useful for discriminating species of the group, especially the wrinkling and sclerotization of the ductus bursae, the development of the ventral pouch, and the

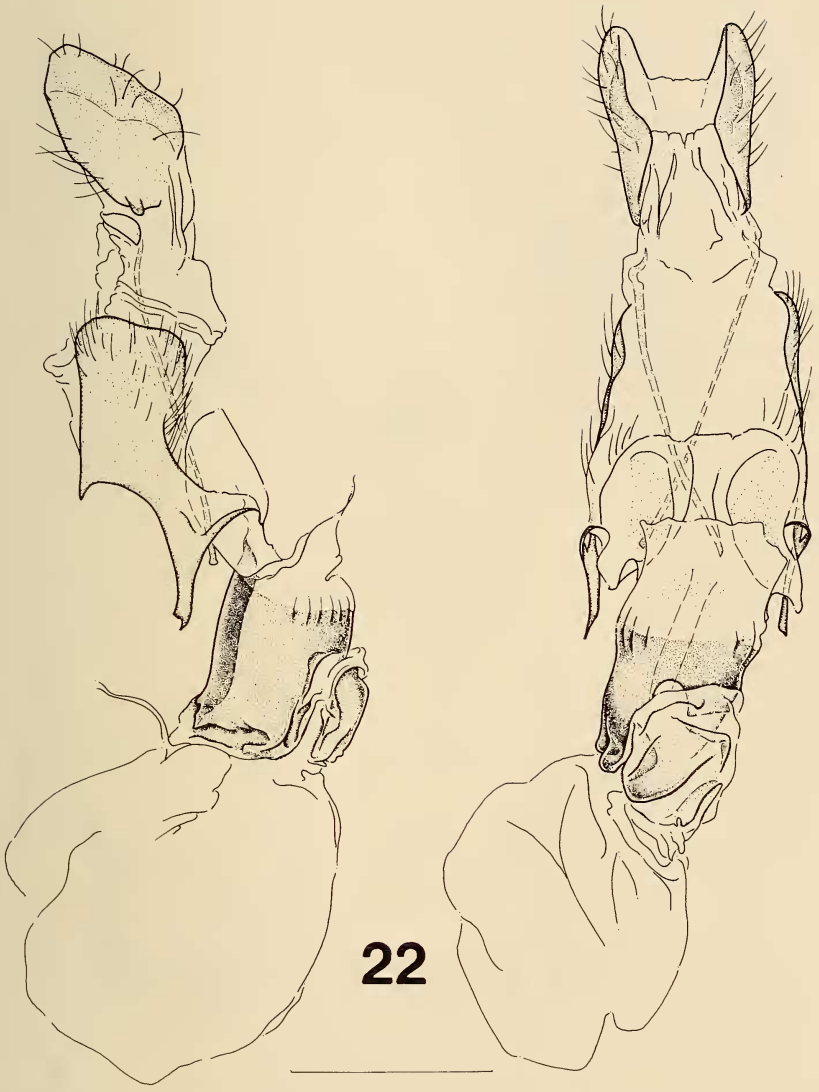
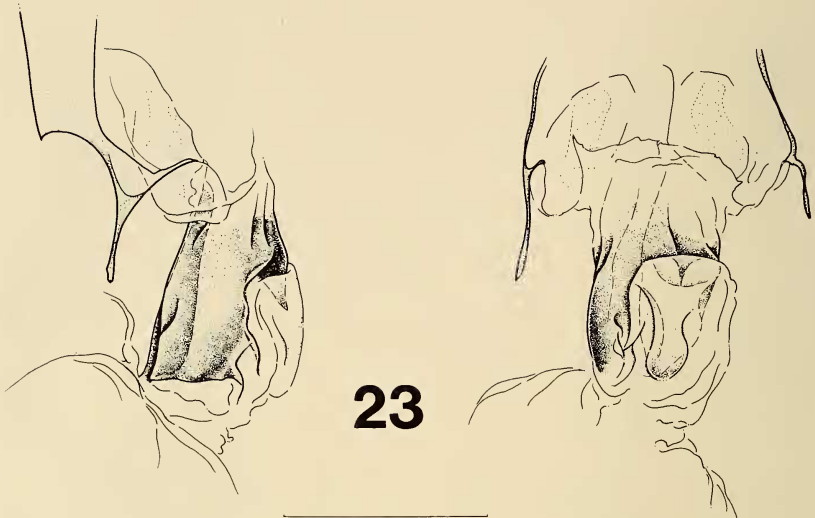
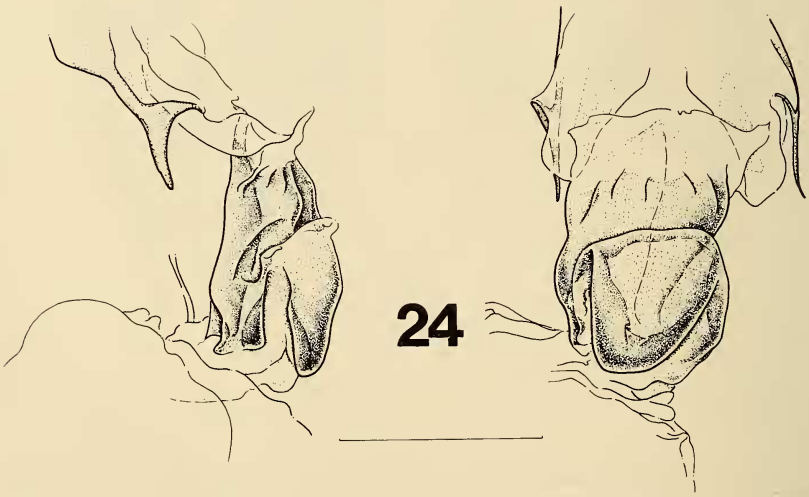


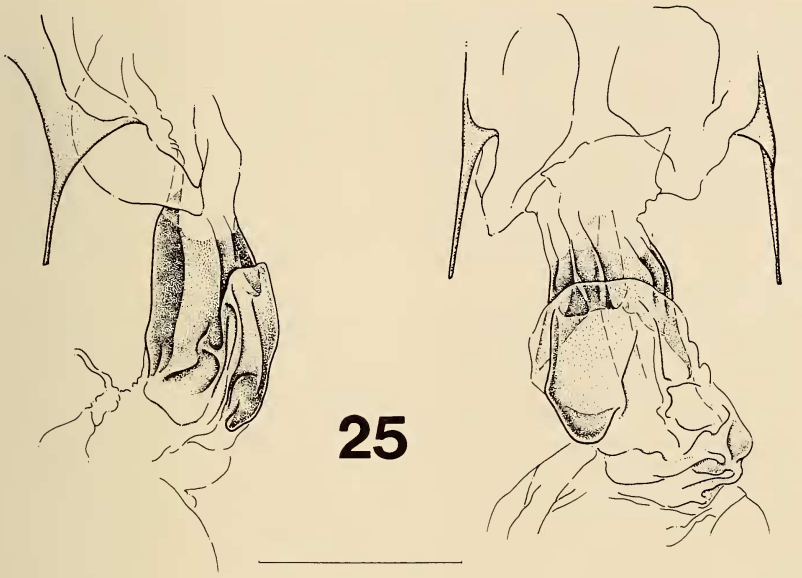
FIG. 22. Female genitalia of *Polites norae*, paratype, left lateral and ventral aspects. Bacochibampo Bay, vic. Guaymas, Sonora, MEXICO, 20 April 1988, C. D. MacNeill & N. MacNeill-Manss (genitalic dissection no. 6044-CDM). Bar equals 1 mm.

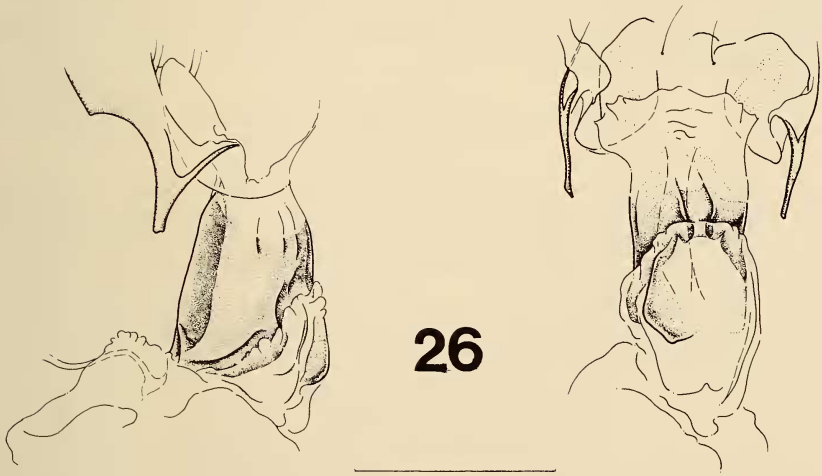
width and course of the dorsal fold of the ductus. The manner of oviposition, the size and color of the ova, the chaetotaxy of the first instar larvae, and other larval and pupal characteristics also will serve to separate species within this group.





FIGS. 23, 24. Ductus bursae and portions of the corpus bursae and sterigma of the female genitalia of two species of *Polites*, left lateral and ventral aspects. Bar equals 1 mm. **23,** *Polites sabuleti sabuleti*, same data as Fig. 20 (genitalia dissection no. 5048-CDM); **24,** *Polites mardon*, Signal Peak, Yakima Co., Washington, 2 July 1965, E. J. Newcomer (genitalia dissection no. 6038-CDM).





FIGS. 25, 26. Ductus bursae and portions of the corpus bursae and sterigma of the female genitalia of two species of *Polites*, left lateral and ventral aspects. Bar equals 1 mm. **25,** *Polites sabuleti margaretae*, paratype, same data as Fig. 21 but date is 6 December 1961 (genitalia dissection no. 6045-CDM); **26,** *Polites norae*, paratype, same data as Fig. 22 but date is 21 April 1988 (genitalia dissection no. 6035-CDM).

DESCRIPTION OF A NEW SPECIES OF *POLITES*

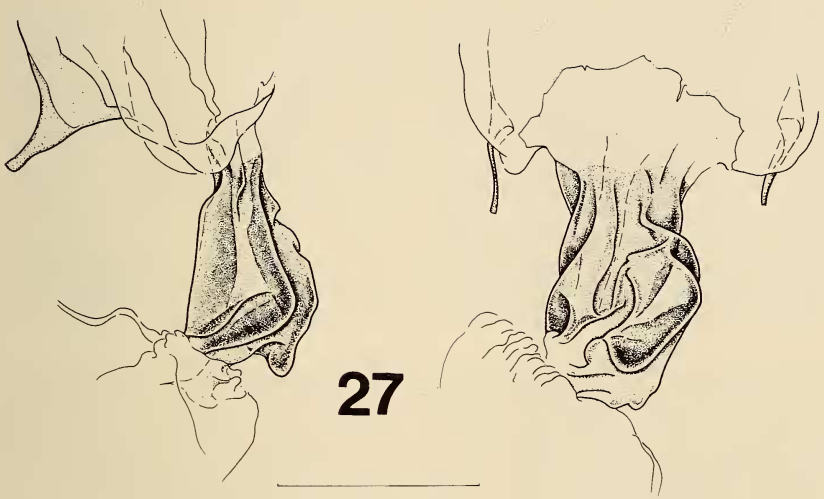
In my review of the Hesperiidae of Baja California (MacNeill 1962), I noted the resemblance of a single female specimen of *P. sabuleti* from Santa Maria Bay to an undescribed species from the Mexican mainland nearby. The Baja population later was described from maritime grassland as *P. sabuleti margaretae* Miller and MacNeill (1969). The lone male of the new mainland species (from Guaymas, Sonora) remained unique until recently when more material, including two females, became available.

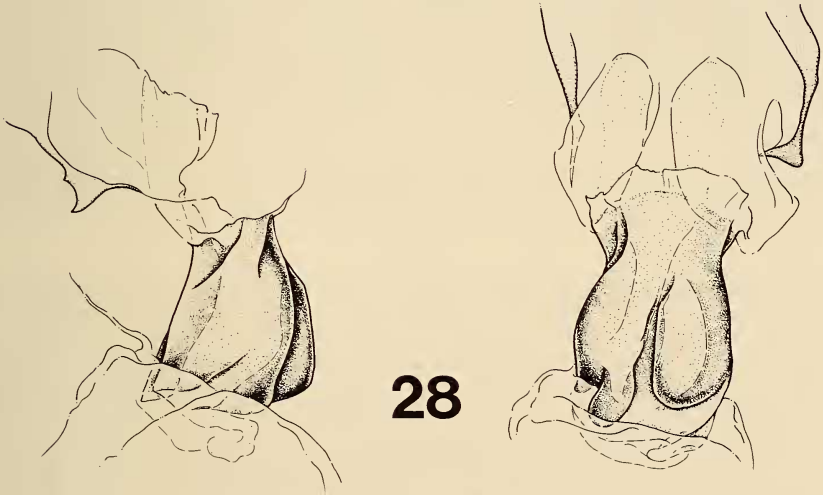
This new species is distinct from all other *Polites* in that males completely lack a stigma. If this and similar structures (costal fold, leg, abdomen or wing brushes, etc.) are pheromonal in function (Muller 1878, Scudder 1889, Barth 1952, 1955) and are important to specific recognition and courtship (MacNeill 1964, Burnes 1964, Scott 1973), then their complete absence in closely related populations implies isolation at the courtship stage. Courtship may even fail owing to communication barriers resulting from slightly differing stigmal structures between populations—different chemical dialects, so to speak. In any case, the structural and biological differences among populations of *P. sabuleti* (s.l.) (Shapiro 1975, MacNeill unpubl. data) require more careful scrutiny in light of the close similarity of the following new species to *P. sabuleti margaretae*.

Polites norae MacNeill, new species
(Figs. 6, 7, 15, 16, 22, 26, 30–33)

Male. *Head:* Antennal shaft checkered fulvous above, ventrally buffy and laterally black. Club black below apiculus, broadly buff ventrally, and narrowly fulvous on dorsal side of pale brown nudum. Palpal vestiture scaly, not prominently hairy, buff becoming yellow-tinted dorsad, third segment protruding clear of vestiture, black with a few buff scales laterally.

Thorax: Pectus buffy white. Femur outwardly mostly black with buffy scales, inwardly mostly buff, tibia and tarsus buffy. Dorsally black clothed with golden scales. *Wing:* Upper surface. Forewing broadly fulvous from the black-edged costa to space 1a with crisply dentate brown border. Stigma entirely absent. Two discal, oval, brown spots outwardly well defined in spaces 1b and 2, the former tending to extend narrowly and vaguely to base, space 1a with a vague, brown suffusion. Postdiscal elongate, brown spots at end of cell in spaces 4 and 5 and separated by fulvous along vein 5, subapical and subterminal fulvous spots connected by fulvous broadly along vein 6 (which itself is narrowly black). Fulvous of base and disc more reddish orange than the colder fulvous of the subapical and subterminal spots and the spots in spaces 1b to 3. Hindwing brown border distinct and broad, cut deeply along fulvous veins 1b to 6, posterior arm of fulvous macular band narrow and defined inwardly by suggestion of brown spots discally in spaces 2 and 3, as well as in spaces 1c, 5 and 6 and partially in 4, leaving a narrow, fulvous ray conspicuous from near base through lower half of cell to vertex of macular band on spaces 4 and 5. Lower surface. Forewing as above but reddish orange of costa, cell and disc contrasting more with pale subapical, subterminal, and postdiscal spots in spaces 1b, 2 and 3, all of which are extended along veins toward the chocolate brown border which is overscaled with orange. Small, dark brown, oval spot in space 2 separated by yellow vein 2 from





FIGS. 27, 28. Ductus bursae and portions of the corpus bursae and sterigma of the female genitalia of two species of *Polites*, left lateral and ventral aspects. Bar equals 1 mm; **27,** *Polites draco*, Hwy. 91 N.E. Leadville, Lake Co., Colorado, 11 July 1976, R. E. Stanford (genitalia dissection no. 6041-CDM); **28,** *Polites peckius*, Dodgeville, Iowa Co., Wisconsin, 4 July 1950, W. E. Seiker (genitalia dissection no. 6053-CDM).

larger brown spot extending proximally to base in space 1b, the distal edge apically bevelled to a point under outer edge of spot in space 2. Hindwing chocolate brown with contrasting yellow veins and yellow macular band as in *P. sabuleti margaretae*, but the angle of the macular band chevron is wider and the posterior arm more closely parallels the wing margin, the spots of the posterior arm tend to be offset of unequal size so the

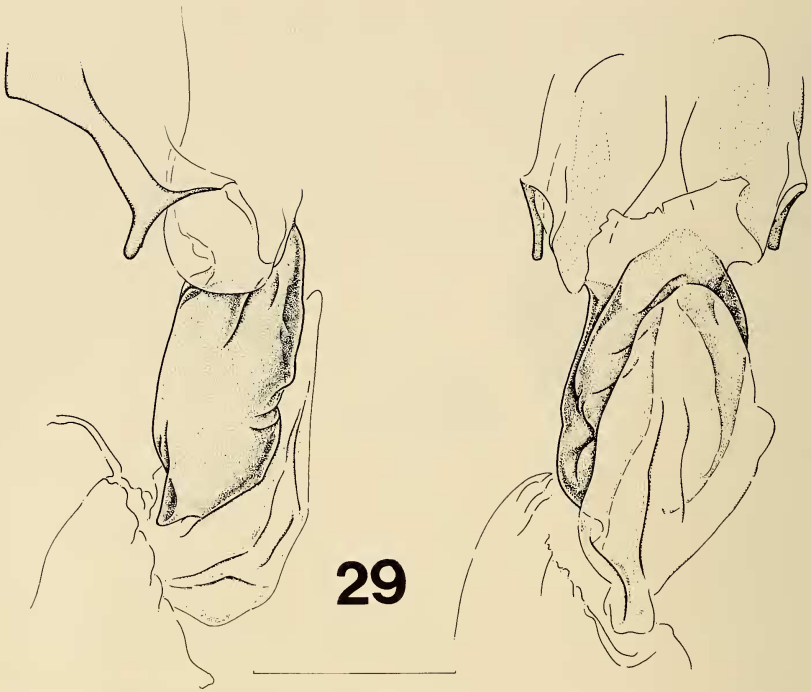


FIG. 29. Ductus bursae and portions of the corpus bursae and sterigma of the female genitalia of *Polites themistocles*, left lateral and ventral aspects. Williams Prairie, N. of Oxford, Johnson Co., Iowa, 28 May 1971, S. Miller (genitalia dissection no. 6052-CDM). Bar equals 1 mm.

arm is sinuate, not straight as in *margaretae*, and the anterior arm clearly extends as a wide spot across space 7. *Forewing length:* Left forewing 13.0 mm (paratypes 11.75–13.75 mm, n = 13).

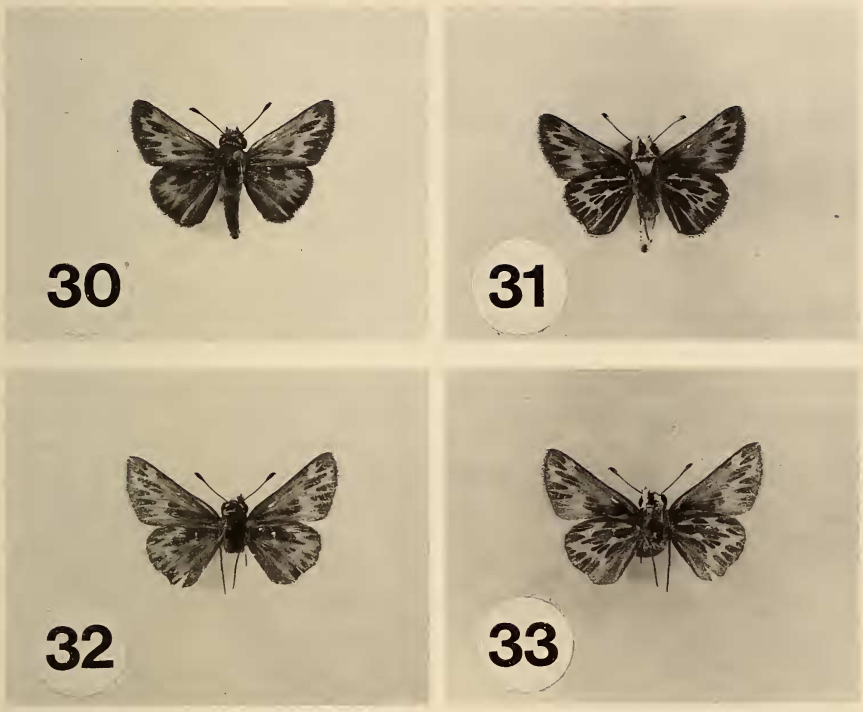
Abdomen: Ventrally buff, laterally with ochre hairs and scales, dorsally black with gold hairs cephalad. *Genitalia:* Penis slender, coecum penis slightly longer than mid-aedeagus width laterally, moderately reflexed ventrally cephalad, rostella of unequal length, and with two sclerotized, multidentate cornuti, one conical and one tented and nearly or quite rectangular in side view. Tegumen in dorsal view broader than in *sabuleti* and taper of uncus to caudal tip relatively abrupt as in *margaretae*, terminal cleft longer than in *margaretae*. Valvae with a much more prominent "chin" caudally on the valvula in lateral aspect than in *margaretae*.

Female. Head, thorax, and abdomen as in male except for wing and genitalia.

Wing: Forewing longer, narrower and slightly more pointed apically than in *margaretae*. Markings as in male but the two discal, oval brown spots in spaces 1b and 2 larger and that in space 1b extends prominently to the base above. Hindwing above with the fulvous ray through cell more prominent than in male. Lower surface as in male but pale spot of anterior arm of macular band in space 7 larger. *Forewing length:* Left forewing 13.75 mm, 14.5 mm (n = 2 paratypes).

Genitalia: Ductus bursae relatively unwrinkled; ventral pouch small, little sclerotized; dorsal fold narrow, conspicuous.

Holotype. Male. MEXICO: Sonora, Bacochibampo Bay, vic(inity) Guaymas, IV-21-88;



FIGS. 30–33. Adults of *Polites norae* from Bacochibampo Bay, Sonora, MEXICO (even numbers upper side, odd numbers lower side; all ×1); **30, 31,** Holotype male; **32, 33,** Paratype female (genitalic dissection no. 6044-CDM).

C. D. MacNeill and N. MacNeill-Manss, collectors. Deposited in the California Academy of Sciences, San Francisco (CAS).

Paratypes. Twelve male and two female paratypes same data as holotype except as follows: one male and one female IV-20-88, the female genitalia no. 6044 C. D. MacNeill, 1991; one male genitalia no. 6025, and one female genitalia no. 6035, both C. D. MacNeill, 1991; four males IV-22-88, three with genitalia nos. 6010, 6012, 6013, all C. D. MacNeill, 1991. One male, Guaymas, Mex(ico), April 13, 1921, E. P. VanDuzee, collector, genitalia no. 3986 J. H(errera), 1982. One male, San Carlos Bay, Sonora, Mexico, XII-22-35, Fred H. Rindge, collector. One male Mazatlan, Sinaloa, Mex(ico), Dec(ember) (19)16, J. August Kusche. Two male paratypes in the National Museum of Natural History, Smithsonian Institution (USNM), two male paratypes American Museum of Natural History (AMNH). Two male paratypes in the California Academy of Sciences, San Francisco (CAS), one male paratype in the Allyn Museum of Entomology (AME), and temporarily, the remaining five male and two female paratypes in the collection of C. D. MacNeill.

A specimen from San Carlos Bay, in Sonora, Mexico, was cited (as a female) by Austin (1987) as having a similar phenotype to *P. sabuleti margaretae*. That specimen is the San Carlos Bay male paratype cited above. *Polites norae* may easily be distinguished from *P. sabuleti margaretae* by the complete lack of a stigma in males, by the suggestion

of a fulvous ray through the cell of the hindwing above, and below by the wider angle of the macular band chevron (more acute in *margaretae*), the lower arm of which is more sinuate while the upper arm is extended across space seven (compare Figs. 31, 33 with figs. 4, 6 in Miller & MacNeill 1969). In the male genitalia of *norae*, the valvula of the valva has a prominent "chin" in lateral aspect, and the larger cornutus tends to be more rectangular. Females have a nearly wrinkle-free ductus bursae.

The species appears to be almost restricted to the upper intertidal zone of maritime marshes and just above. This zone seems to be dominated by one of two grasses, *Monanthochloe littoralis* Engleman (Poaceae) (Oakland Museum voucher #048820), a low growing, very prickly-looking carpet that doesn't much resemble a grass, or the related salt grass *Distichlis spicata* var. *stricta* (A. Gray) Beetle (Poaceae) (Oakland Museum voucher #048821), the presumed larval food plant (both grasses determined by Alan R. Smith, U.C. Berkeley Herbarium). Most of the accessible coastal marshes from just east of Guaymas north to Bahia Kino were checked for this skipper and for *Distichlis*. *Monanthochloe* was abundant and widespread in the marshes. A few marshes supported some *Distichlis*, usually near an at least ephemeral, fresh water stream. The type locality was the only brackish lagoon examined having a flowing fresh water input as well as a good stand of cattails (*Typha* sp?) (Typhaceae). The skippers were found with the grass well out into the upper intertidal region and also a short distance upstream above tidal reach. None was seen to nectar feed. A substantial brackish marsh with cattails was seen near Empalme, just east of Guaymas, but was inaccessible.

The grass at the type locality was grazed and trampled by small herds of cattle that were often driven through. These sites also served as dumps for copious debris and chemical wastes. These places seem to be waste repositories to the local people, and developers are evidently impressed with the potential for homes and resorts around these lagoons, which are eventually dredged and otherwise modified to accommodate marinas. Although there are still miles of coastline with maritime marshes along western Mexico, those with substantial freshwater input, once they become accessible, are in serious jeopardy of extreme modification owing to chemical contamination and development. While this may take decades, I am alarmed by the extent of change in these marshes (Guaymas, Bacochibampo Bay, San Carlos Bay, and Playa de los Algodones) that occurred between my visits during the 1970's and that of 1988. I suspect that this skipper cannot long survive the progress of humankind.

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